



NOAA
FISHERIES

Habitat
Conservation

U.S. Fisheries and Deep-Sea Coral Habitats: *Policy, Science & Conservation*

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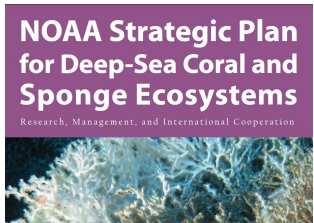
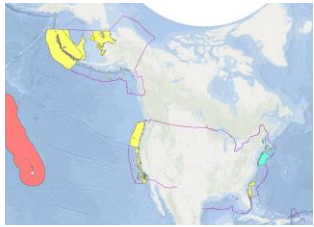
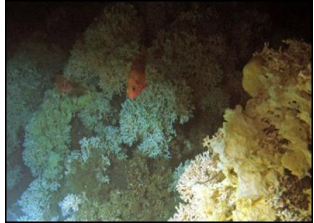
Heather Coleman

Renee King



Dec. 1, 2016

Outline

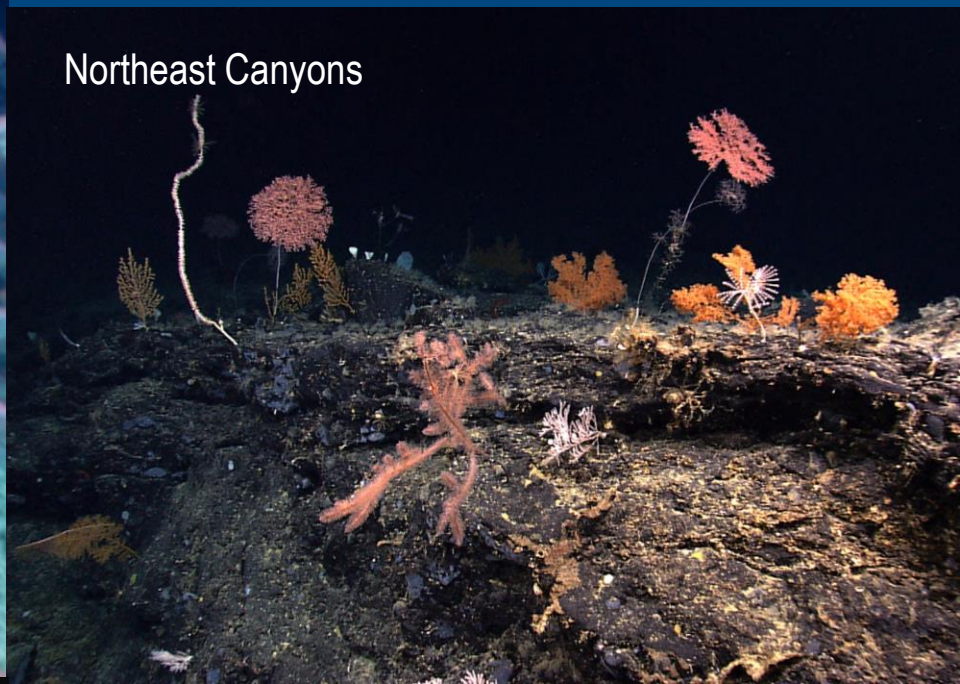


- Fisheries and Deep-Sea Corals
- Progress on Spatial Management
- U.S. Strategy & Research
- Progress, Challenges & Next Steps

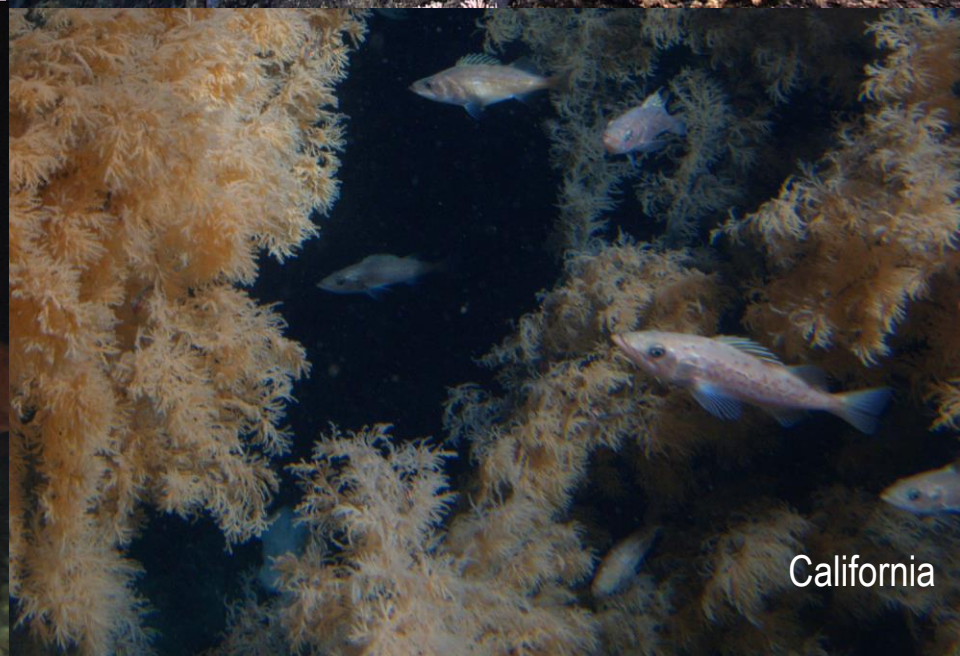
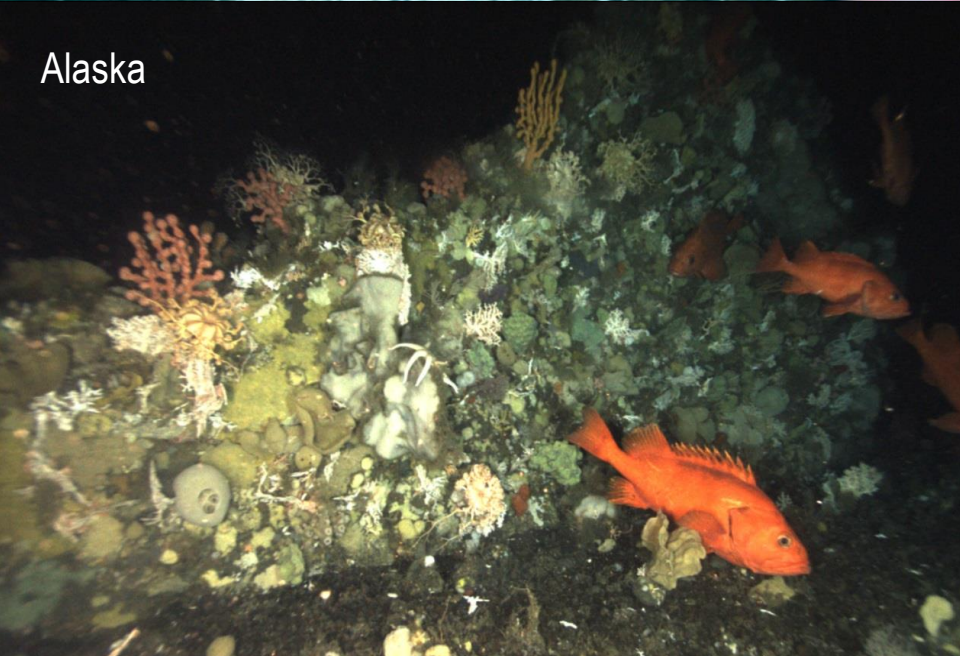
Gulf of Mexico
Lophelia II BOEM/NOAA



Northeast Canyons



Alaska



California

Vulnerable Habitats

Untrawled

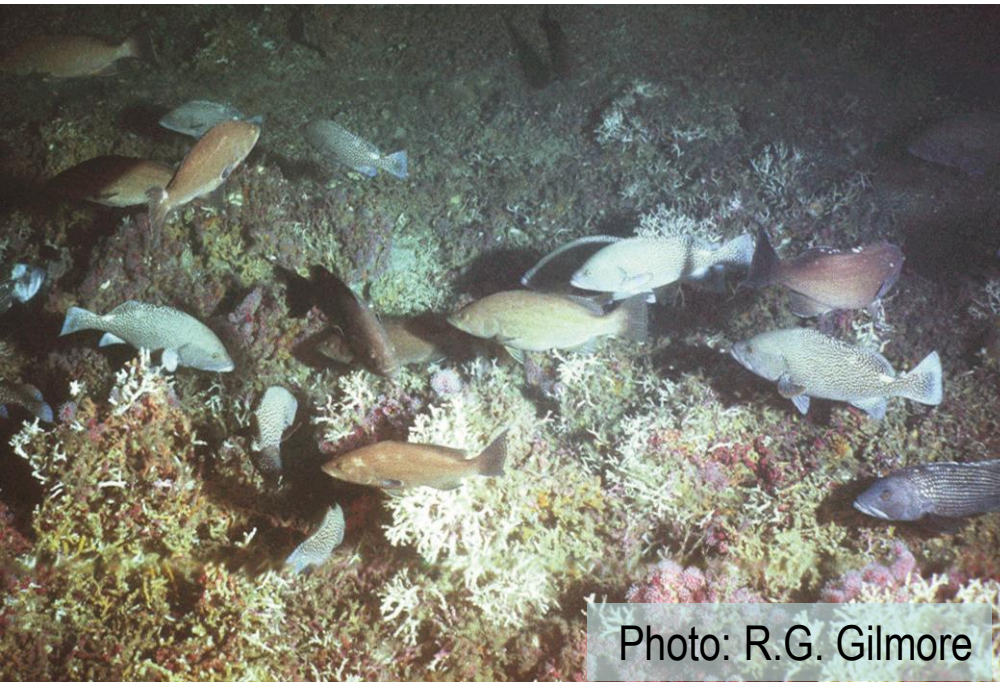


Photo: R.G. Gilmore

Trawled

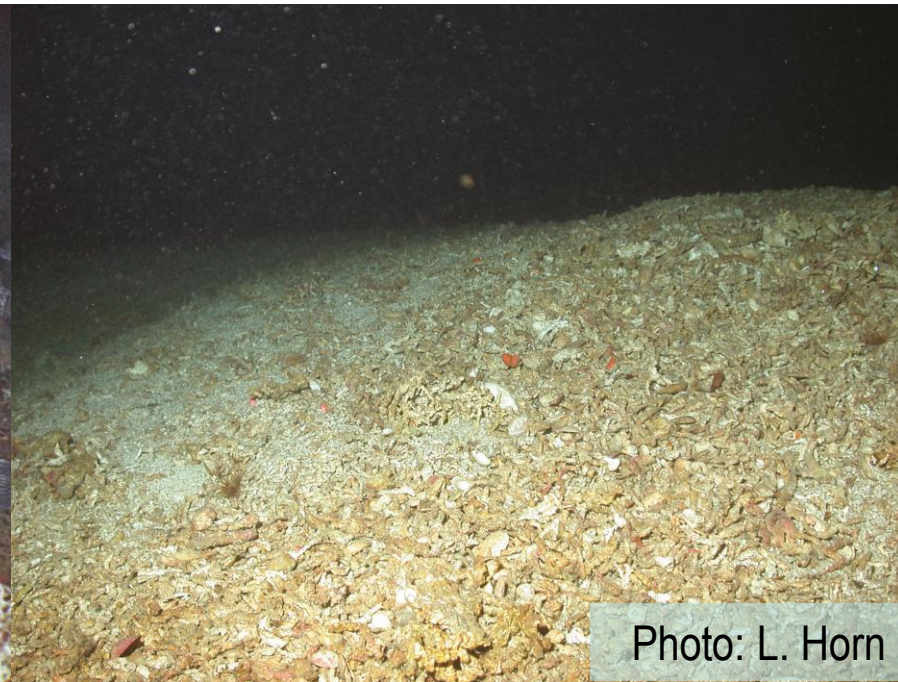


Photo: L. Horn

- Southeast: 90% of *Oculina* reefs lost to bottom trawling.
Source: Koenig et al. 2005
- Aleutian Islands: 49% corals damaged in trawled area vs. 7% in untrawled area.
Source: Heifetz et al. 2009

Bottom Trawling



Disturbance – High

Use – widespread in

Alaska

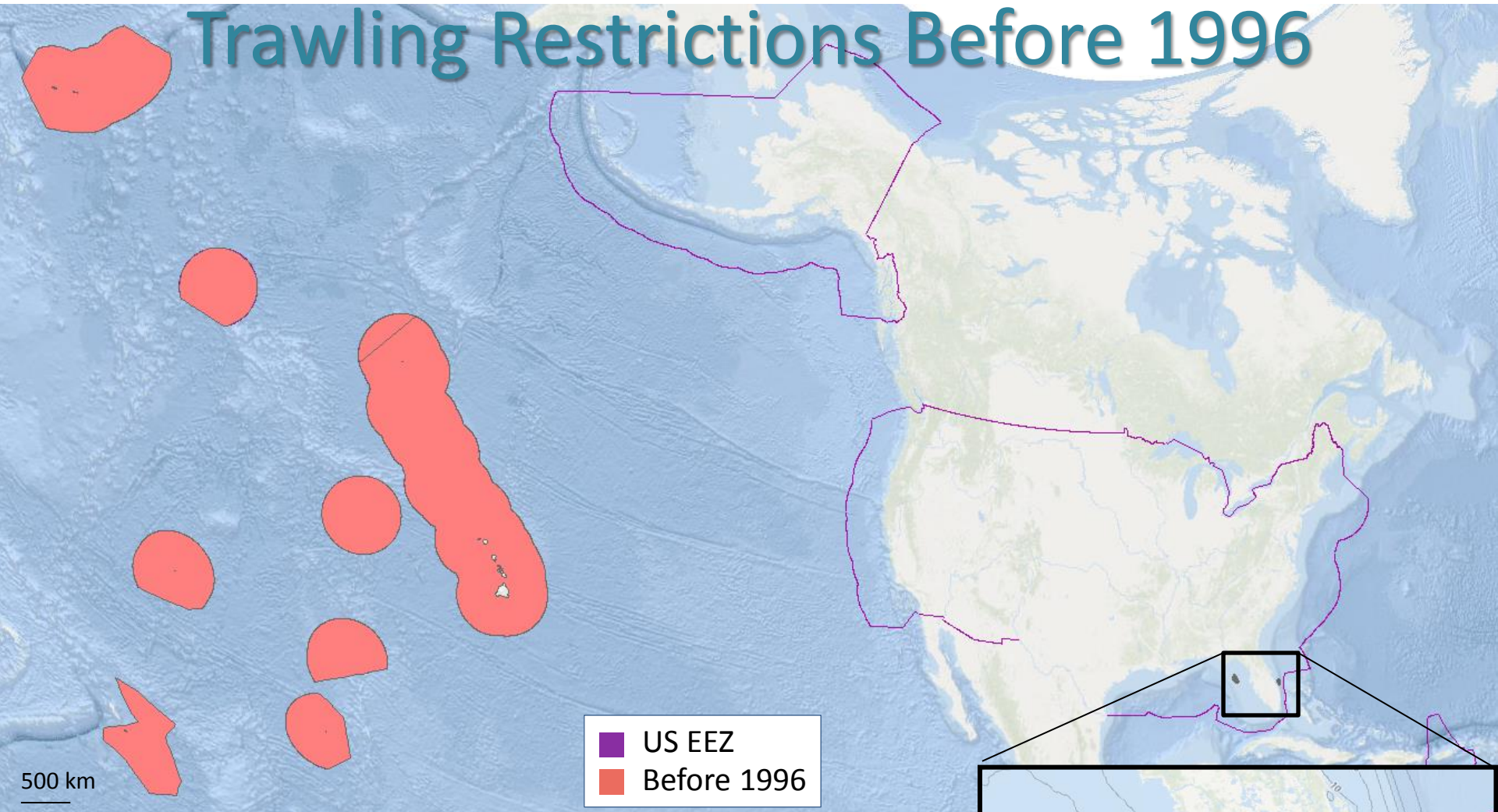
West Coast

Northeast

Gear contact – high

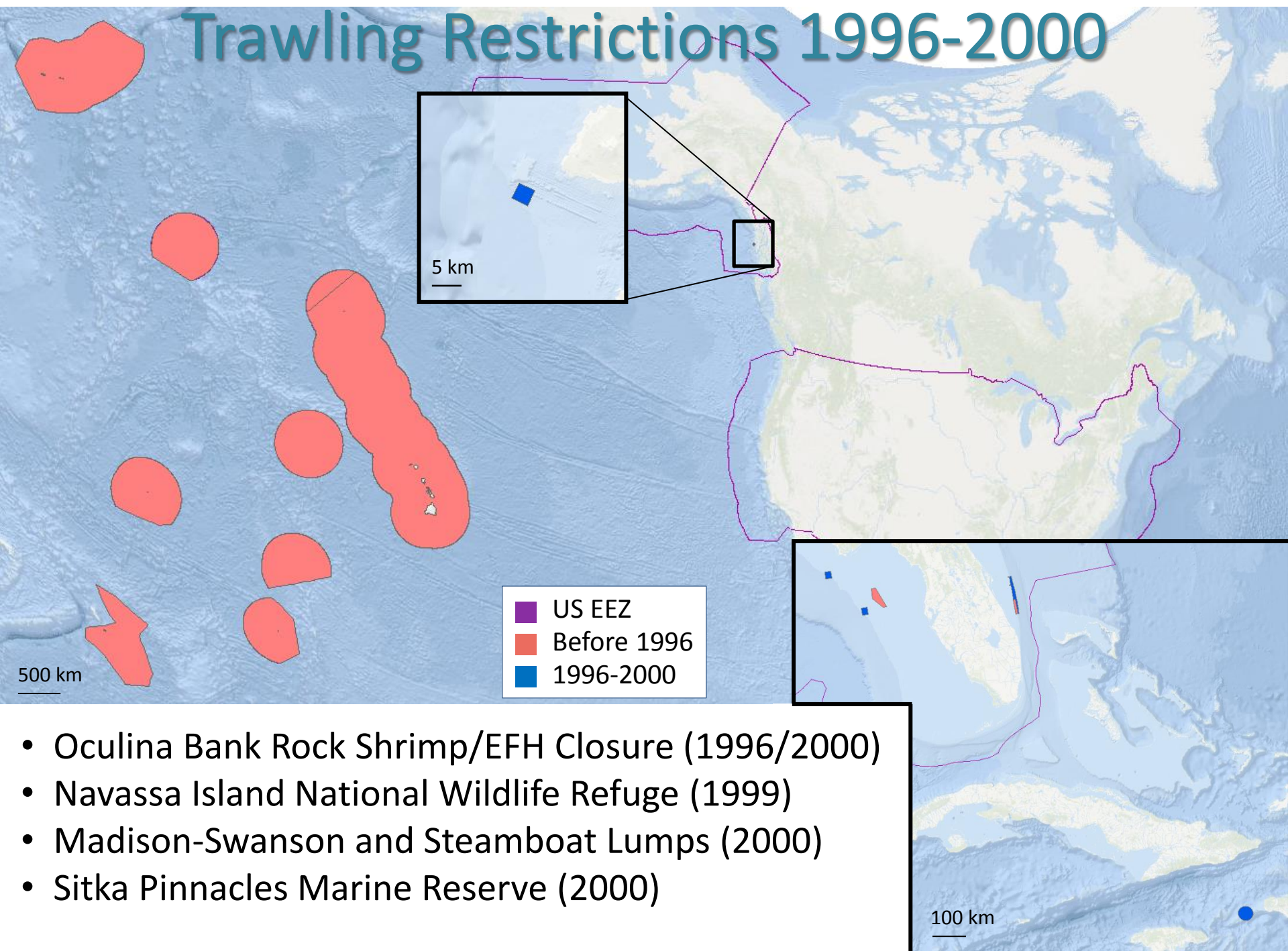
Forces – substantial

Trawling Restrictions Before 1996



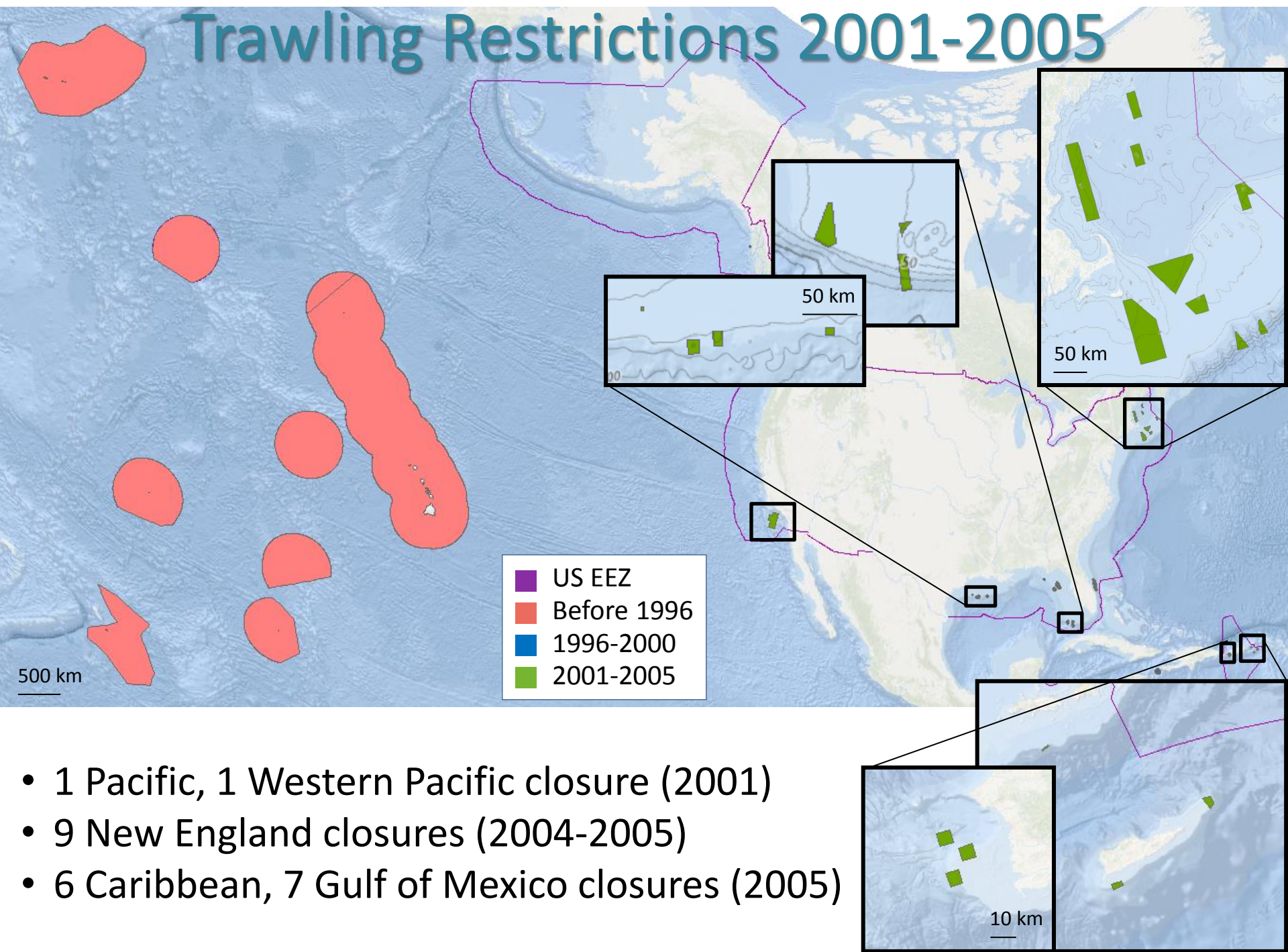
- Western Pacific EEZ-wide Restrictions (1983)
- Middle Grounds HAPC (1984)
- Oculina Experimental Closed Area (1984)

Trawling Restrictions 1996-2000



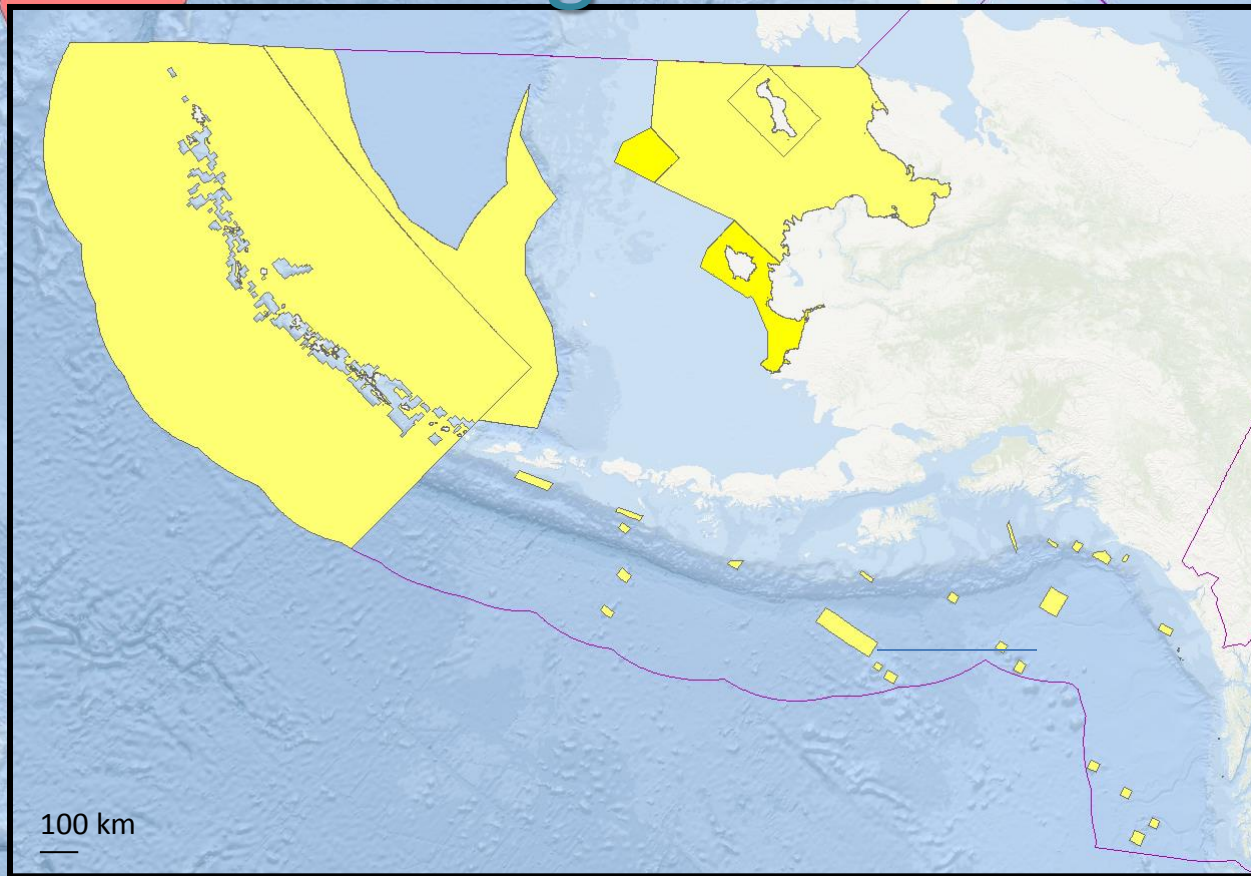
- Oculina Bank Rock Shrimp/EFH Closure (1996/2000)
- Navassa Island National Wildlife Refuge (1999)
- Madison-Swanson and Steamboat Lumps (2000)
- Sitka Pinnacles Marine Reserve (2000)

Trawling Restrictions 2001-2005

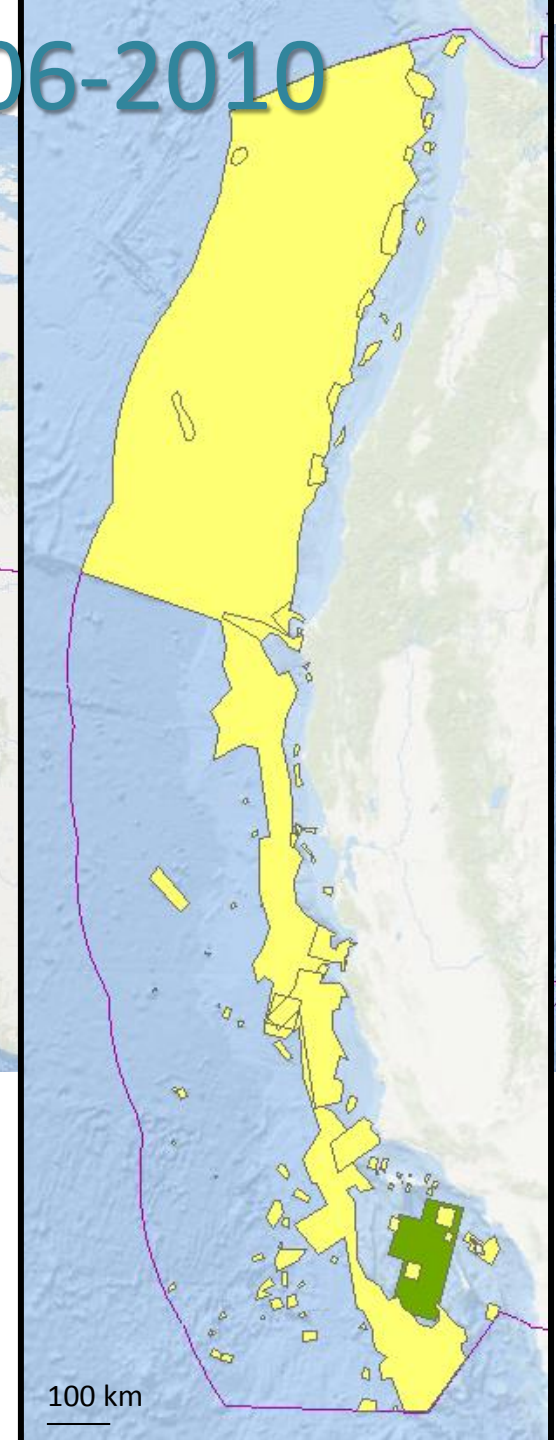
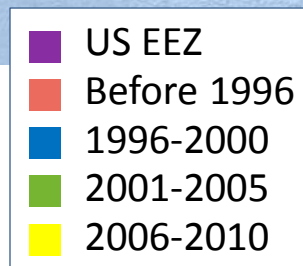


- 1 Pacific, 1 Western Pacific closure (2001)
- 9 New England closures (2004-2005)
- 6 Caribbean, 7 Gulf of Mexico closures (2005)

Trawling Restrictions 2006-2010



- 53 Pacific closures (2006)
- 11 North Pacific closures (2006-2008)
- 4 Pacific Islands closures (2006, 2009)
- 1 Gulf of Mexico, 4 Mid-Atlantic closures (2009)
- 12 South Atlantic closures (2010)



NOAA Strategic Plan

NOAA Strategic Plan for Deep-Sea Coral and Sponge Ecosystems

Research, Management, and International Cooperation

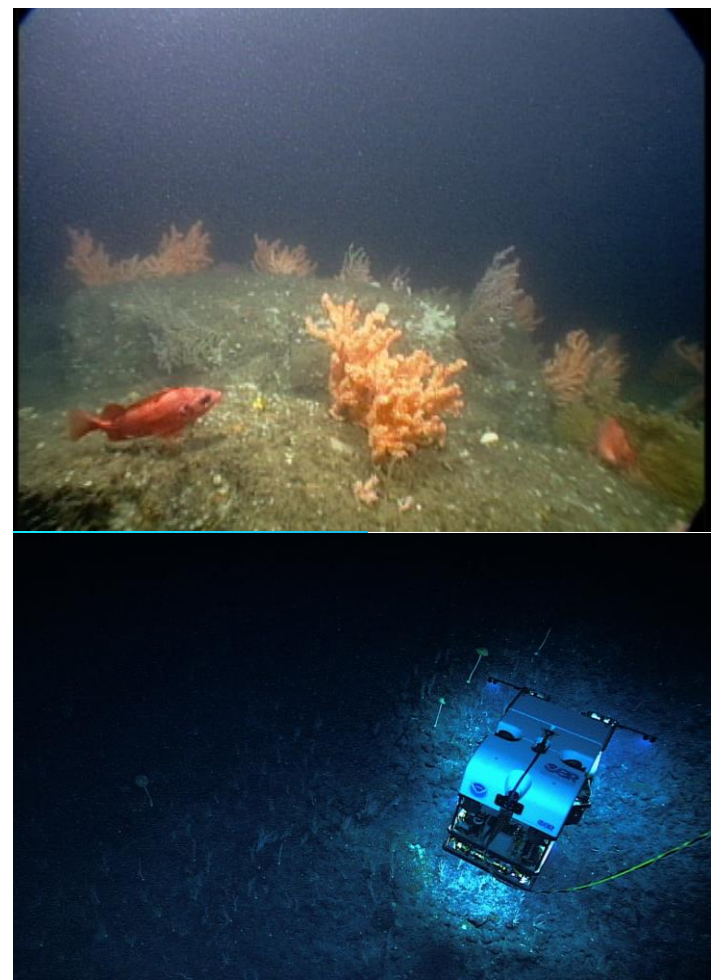


- Guides NOAA activities:
 - 1) Exploration and Research
 - 2) Conservation and Management
 - 3) International Cooperation
- Approach to manage fisheries impacts
 - Integrates authorities
 - Essential Fish Habitat
 - Bycatch reduction
 - Zones to protect corals from fishing gear (New in 2007)
 - Freeze the footprint of trawl fisheries
 - Protect known & predicted coral & sponge habitats

NOAA's Deep Sea Coral Research and Technology Program

Sound scientific information to conserve and manage deep-sea coral ecosystems

- 2007 – Magnuson-Stevens Fisheries Conservation and Management Act
- Spatially explicit & targeted to management
- Integrates
 - Analysis & modeling of existing data
 - Mapping human activities
 - 3-4 year regional Field Research Initiatives
- National-level data management support



Alaska 2012 – 2014

- Fieldwork in Alaska surveyed corals and sponges in the Aleutian Islands, E. Bering Sea canyons and slope, and red tree coral habitats in the Gulf of Alaska
- The research is informing the North Pacific Fishery Management Council's management of groundfishes

Northeast 2012 – 2015

- Coral surveys were conducted in the Gulf of Maine, on seamounts, and in 31 canyons
- The Mid-Atlantic Fishery Management Council used this research as the basis for proposed deep-sea coral protection zones covering over 38,000 sq. miles

West Coast 2010 – 2012

- In partnership with sanctuaries, we surveyed coral and sponge habitats from Washington to Southern California
- The research is informing sanctuary management plans and the Pacific Fishery Management Council's Essential Fish Habitat measures

Southeast, Gulf of Mexico & U.S. Caribbean 2016 – 2019

- Our newest field initiative is working with three fishery management councils and several sanctuaries to better understand the region's rich deep-sea coral habitats.

U.S. Pacific Islands 2015 – 2017

- In partnership with NOAA's Office of Ocean Exploration and Research, we are mapping, exploring, and studying deep-sea coral and sponge communities
- Our research supports priority science and management needs of the region's Marine National Monuments

Nationwide Investment

The Deep Sea Coral Research and Technology Program is the nation's resource for information on deep-sea coral and sponge ecosystems.

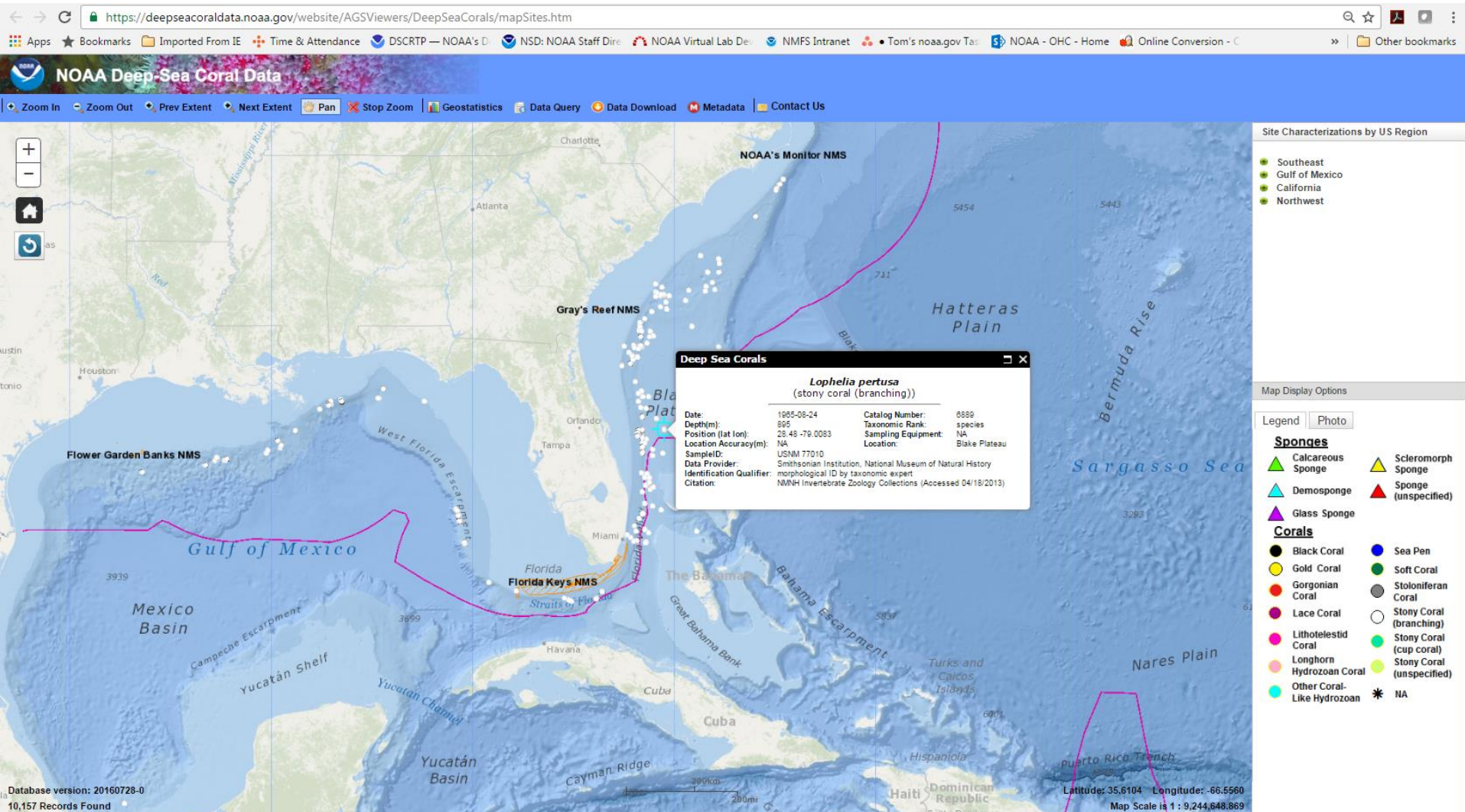
We support:

- Three to four-year regional field research initiatives
- Targeted analyses of ecology, genetics, and fisheries interactions
- The National Deep-Sea Coral and Sponge Database:
<https://deepseacoraldata.noaa.gov/>

Southeast 2009 – 2011

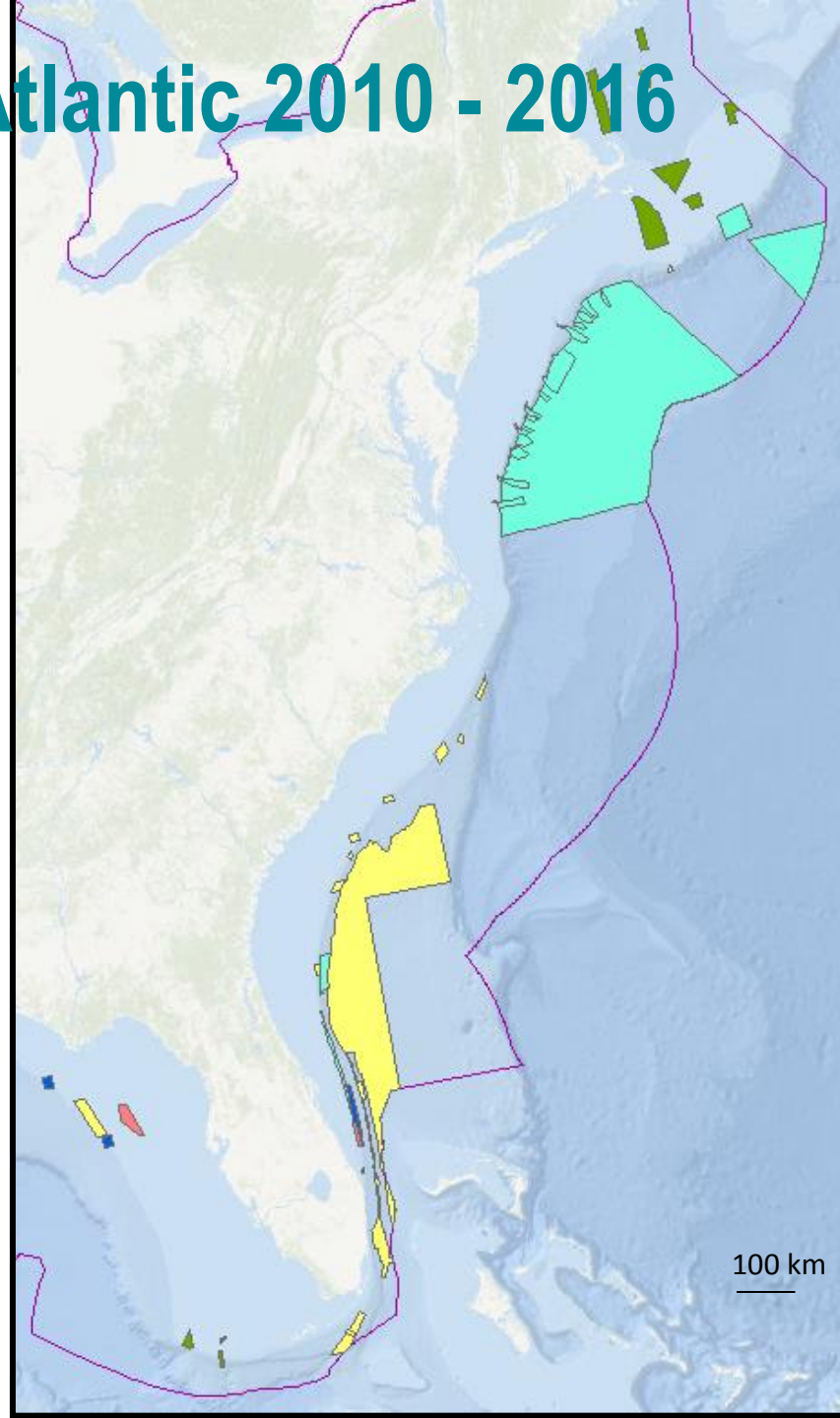
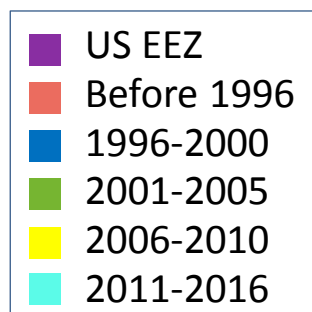
- Our inaugural field research initiative used sonar technology, remotely operated vehicles, and manned submersibles to discover, map, and understand deep-sea coral reefs
- Our research helped the South Atlantic Fishery Management Council delineate fishing zones and protected areas

National Database



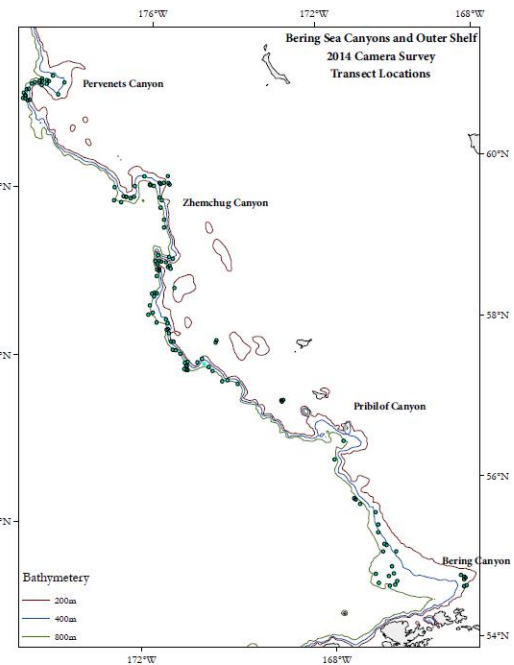
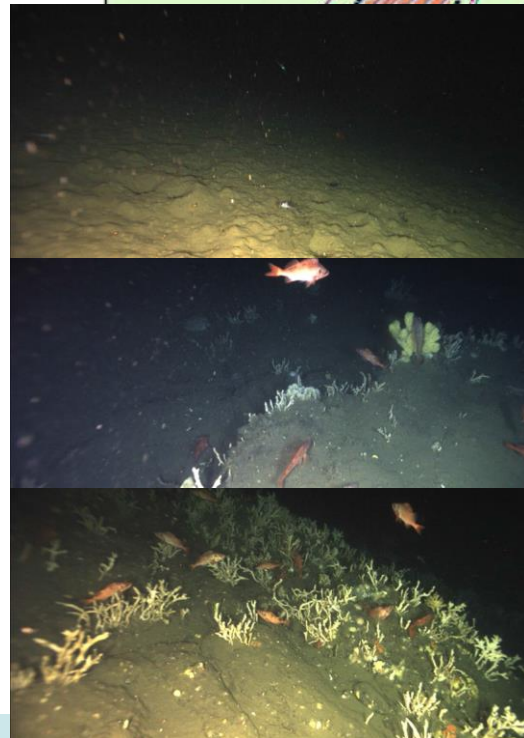
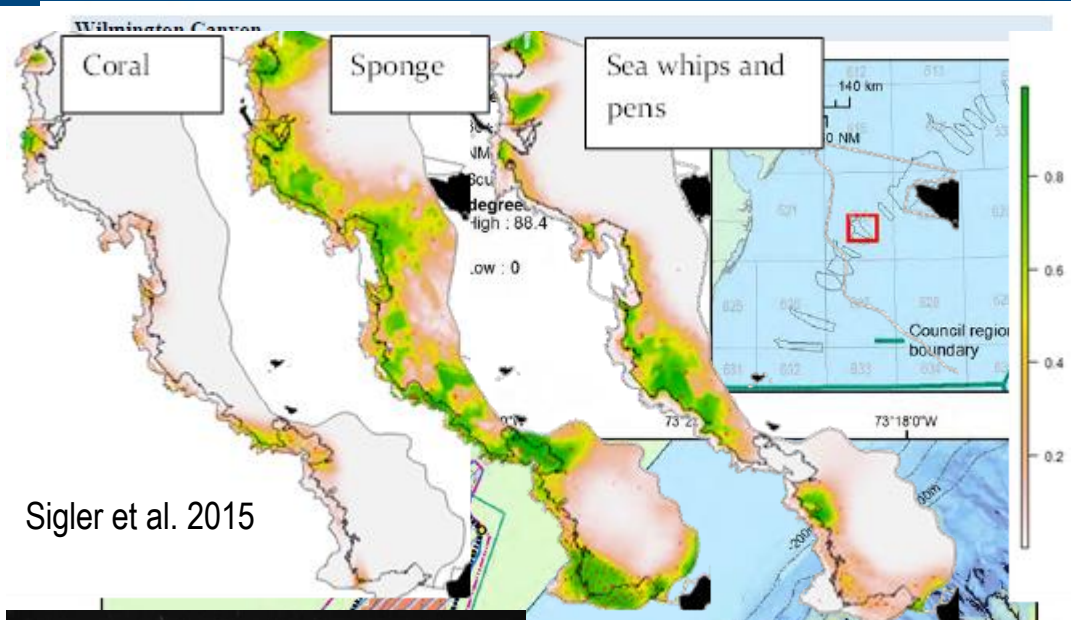
Deep-Sea Coral Focus – Atlantic 2010 - 2016

- South Atlantic Council
 - Deepwater Coral HAPCs (2010)
 - Cape Lookout Lophelia Banks Expansion (2015)
 - Oculina Bank HAPC Expansion (2015)
- Northeast Canyons & Seamounts Marine National Monument (2016)
- Mid-Atlantic Council (2016)
 - 15 Canyons and discrete areas
 - Broad area protection “freezes the footprint”
 - First use of MSA Deep-Sea Coral Provisions
- New England Council
 - Proposed Coral Amendment

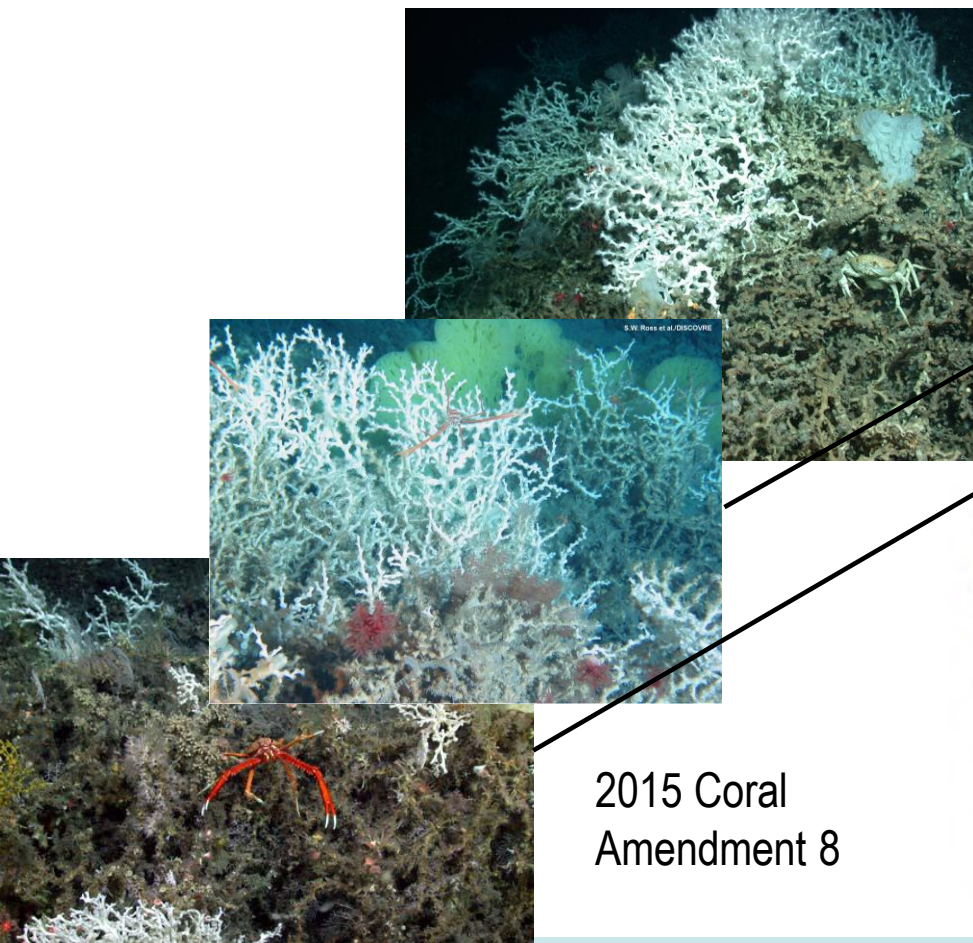


Modeling Informs Management

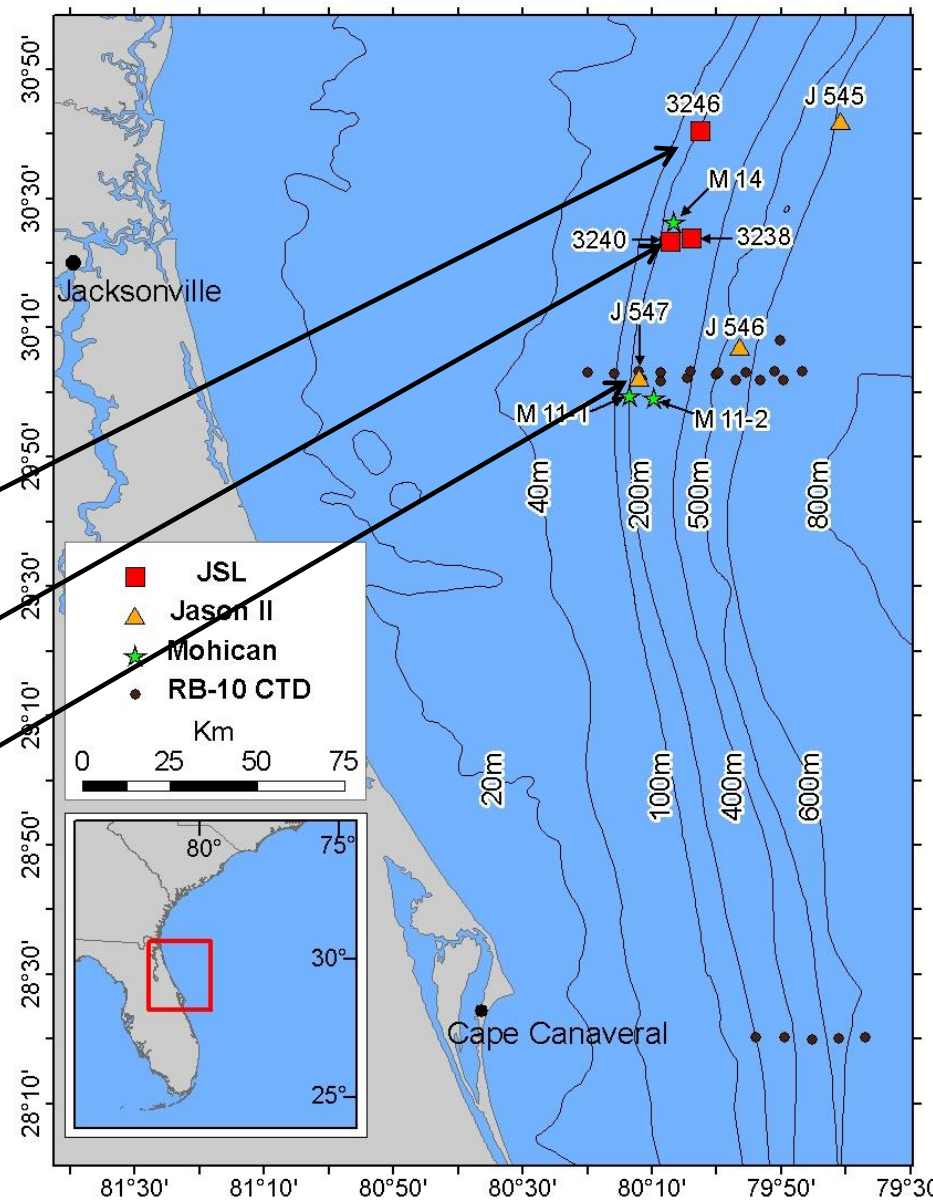
- Mid-Atlantic
 - Modeling informs canyons and discrete areas
- E. Bering Sea Canyons
 - Visual surveys ground-truth models



Research Translates into New Deepwater Coral Protection



2015 Coral
Amendment 8





NOAA
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Draft National Bycatch Reduction Strategy

INTRODUCTION

NOAA Fisheries' core mission is to promote productive and sustainable fisheries and improve the recovery and conservation of protected resources—all backed by sound science and an ecosystem-based approach to management. One key aspect of fulfilling this mission is reducing bycatch. This National Bycatch Reduction Strategy is intended to guide and coordinate our efforts to reduce bycatch and bycatch mortality in the coming years.

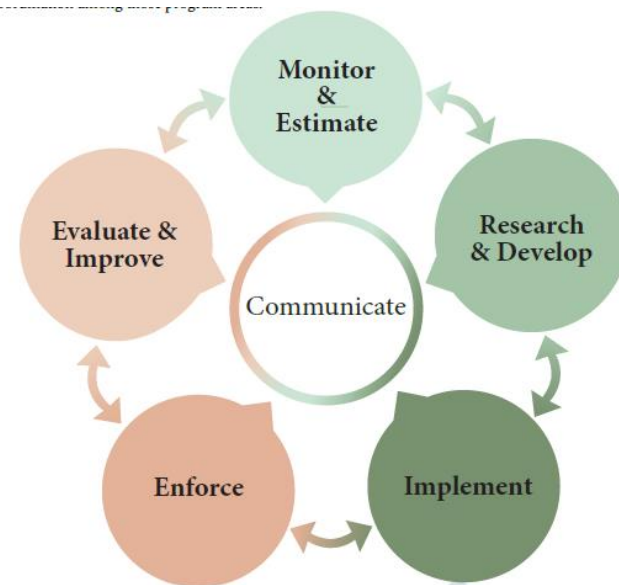
What is bycatch?

Bycatch occurs when fishing operations unintentionally catch and discard fish, cause unobserved injury and mortality, or interact with living marine resources such as marine mammals, sea turtles, seabirds, protected fish, corals, and sponges.

NOAA Fisheries has mandates under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), Marine Mammal Protection Act (MMPA), Endangered Species Act (ESA), and other domestic laws and international agreements to reduce and minimize bycatch, but these mandates address bycatch in different ways. Under the MSA, bycatch is defined as fish¹ that are harvested in a fishery, but which are not sold or kept for personal use, and includes both economic and regulatory discards. An economic discard is a fish that is caught but is discarded because it has a low market value—for example, it may be too small, of poor quality, or discarded for other economic reasons. A regulatory discard is a fish that is discarded because regulations do not allow fishermen to retain the fish when it is caught.



corals and sponges



NOAA FISHERIES

Training Bycatch Observers

US New England
& Mid-Atlantic

Alaska

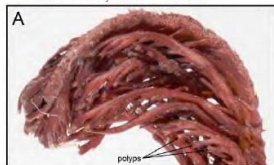
Sea Pens – Pennatulaceans

Pennatula aculeata (Common Sea Pen)

Elongated fleshy stalk supported by a calcium carbonate rod. Upper part feather like with polyps; lower part is an enlarged fleshy peduncle without polyps. Deep red/purplish, becoming lighter and more orange on stalk and yellowish-white at the base. Up to 40 cm in length. Most common and abundant in Gulf of Maine in soft sediments (mud) though often seen farther south; depth range ~80 m to beyond 500 m.



Source: Kenchington et al. 2009



Source: Kenchington et al. 2009



Source: <http://www.marinespecies.org/photogallery.php?album=708&pic=31988>



Source: CaRMS Photogallery / Fisheries and Oceans Canada, Claude Nozères, 2011; <http://www.marinespecies.org/carms/photogallery.php?album=2224&pic=41361>

12

Packer & Drohan 2013

Anthoathecatae (hydrocorals) - continued



Errinopora spp.

Colonies are variable in shape but typically uni-planar or bushy with non-connecting branches. Branches often have blunt tips. Cyclosystems are very small and distributed in rows on the surface of the skeleton. Color is orange or pink.



Stylaster spp.

Colonies are bushy and highly branched, often with interconnected branches with very fine branch tips. Cyclosystems are raised above the surface of the skeleton and may be arranged on all surfaces. Colonies may be up to one meter tall and width but are often highly fragmented on deck as they are extremely fragile. Color is orange, pinkish orange, or pink.

Scleractinia (stony corals)

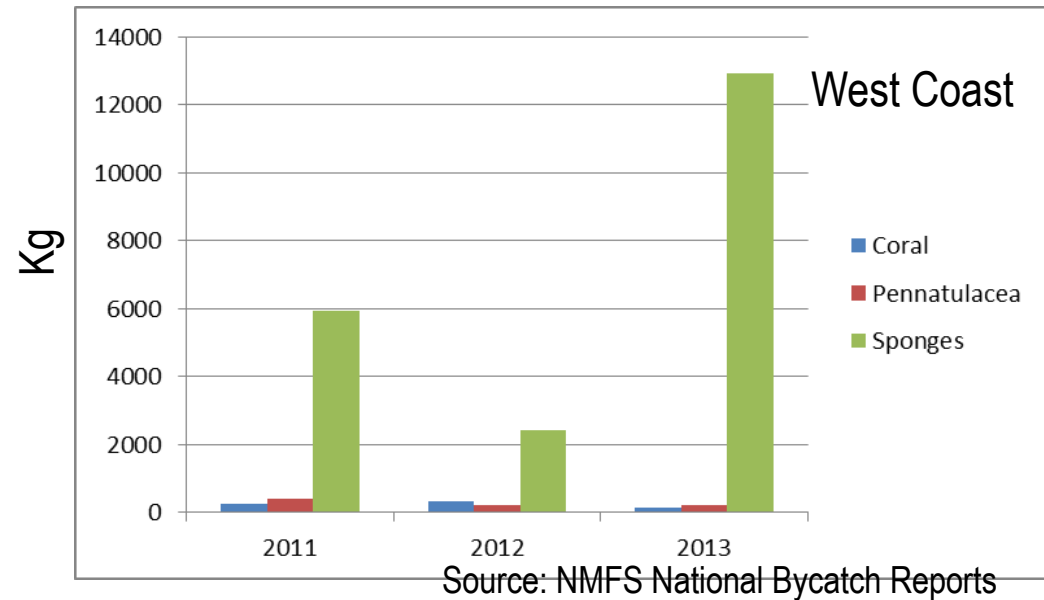
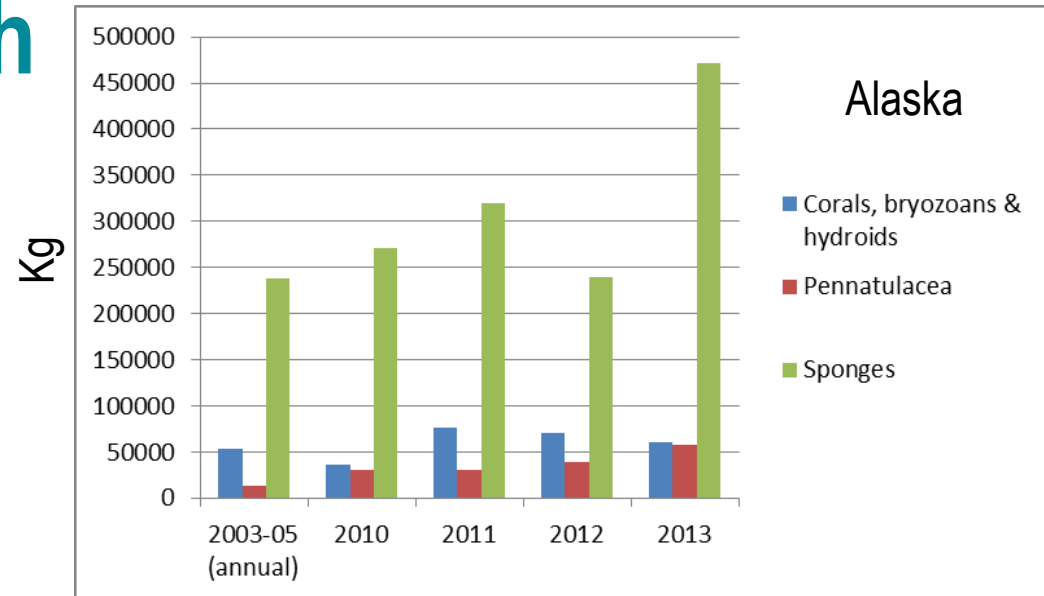
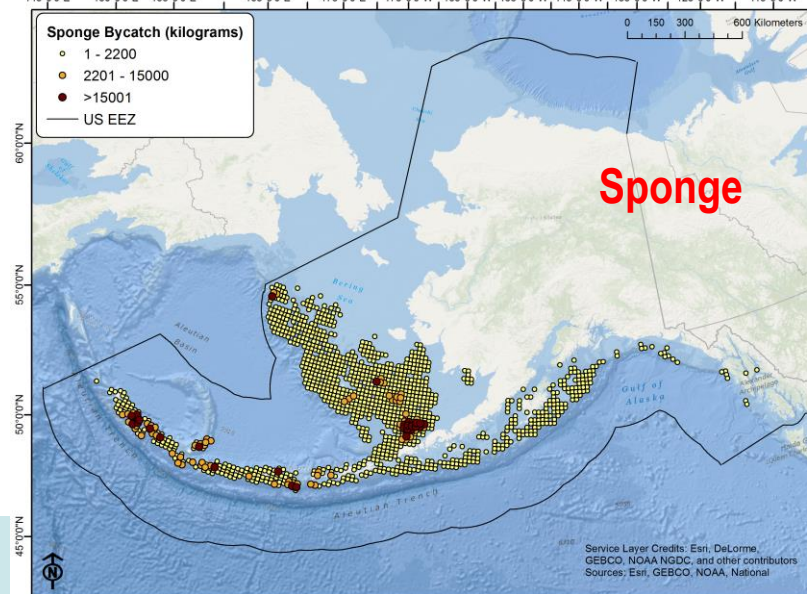
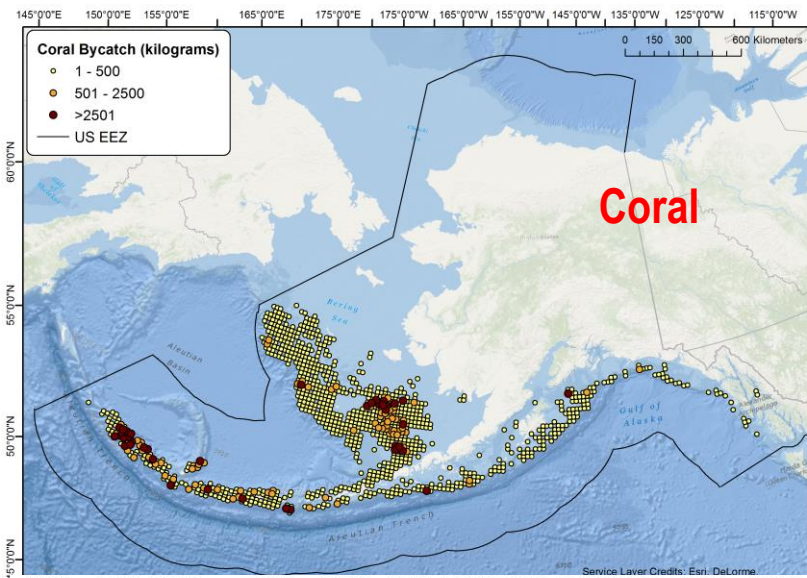
All stony corals in Alaska are small 'cup' corals with a hard calcareous skeleton. Polyps are embedded in a calyx (or cup) with septae arranged in a radial pattern. Specimens are fragile and collected specimens may be fragmented. Live specimens have soft tissue in the calyx that produces mucus when stressed. Dead specimens are often bleached in color and may be encrusted with sand and other organisms (tube worms etc.). Calyx color is white, light pink or light brown.



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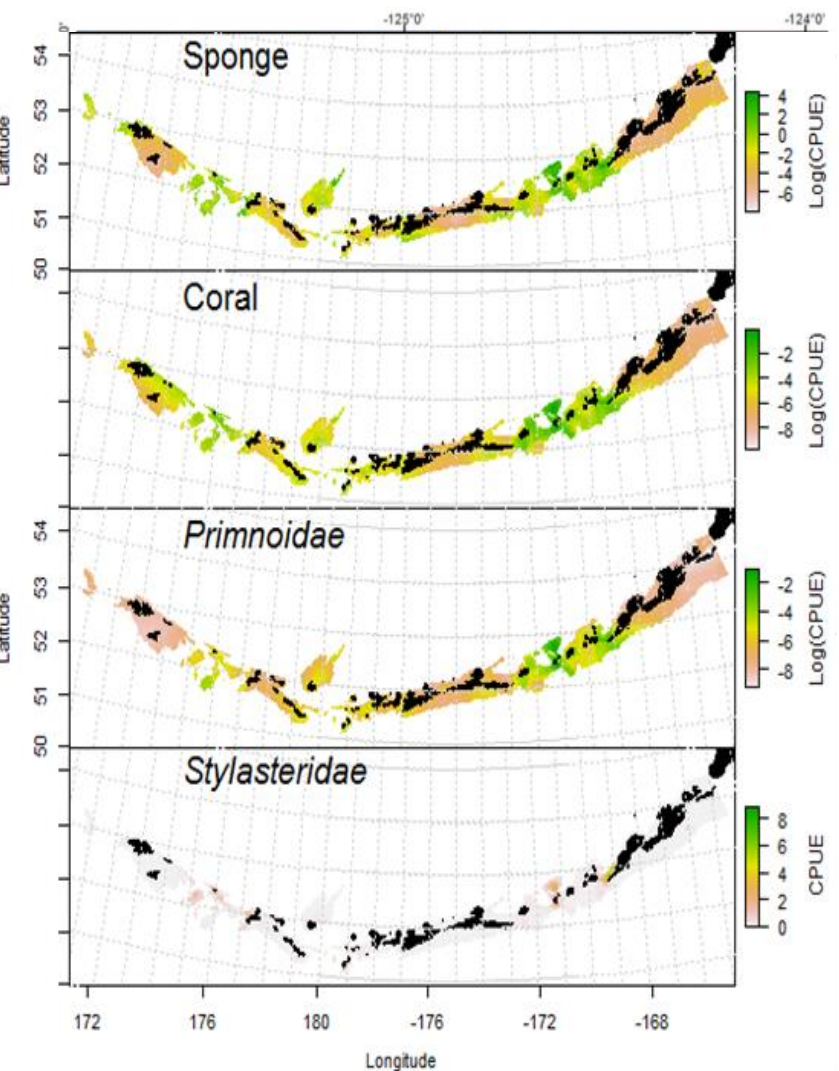
Stone, Stevenson & Brooke 2015

Monitoring Bycatch



Source: NMFS National Bycatch Reports

Challenges & Next Steps



Policy:

- Spatial information on fishing

Science:

- Surveys of high-bycatch areas
- Incorporate abundance, density & diversity into surveys and models
- Expand spatial analysis tools

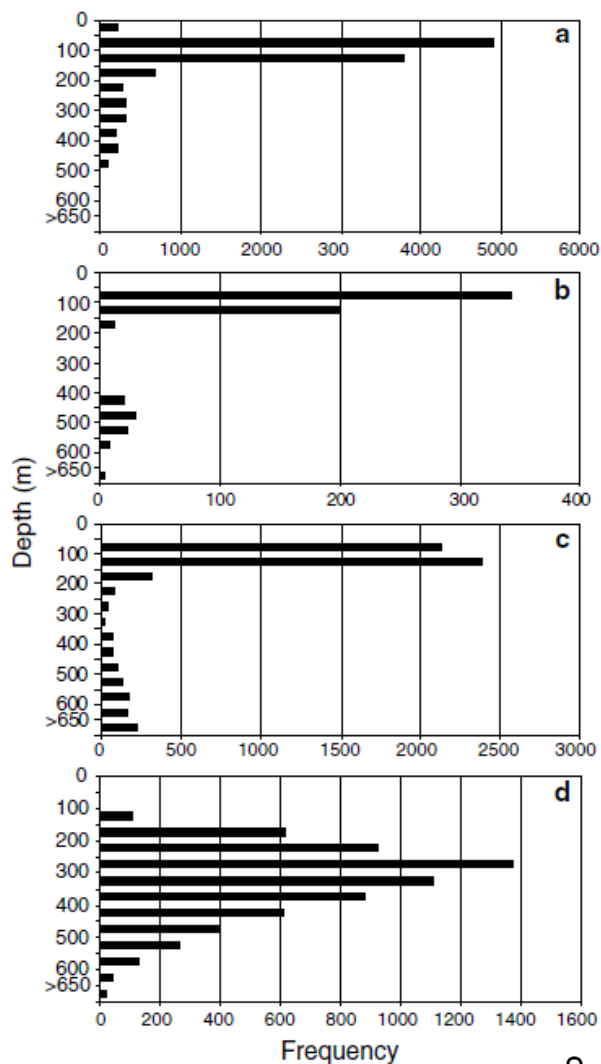
Management:

- Integrate bycatch in spatial management
- Adaptive management
- Incorporate biogenic habitat in ecosystem approaches



Thanks!

Aleutian Islands



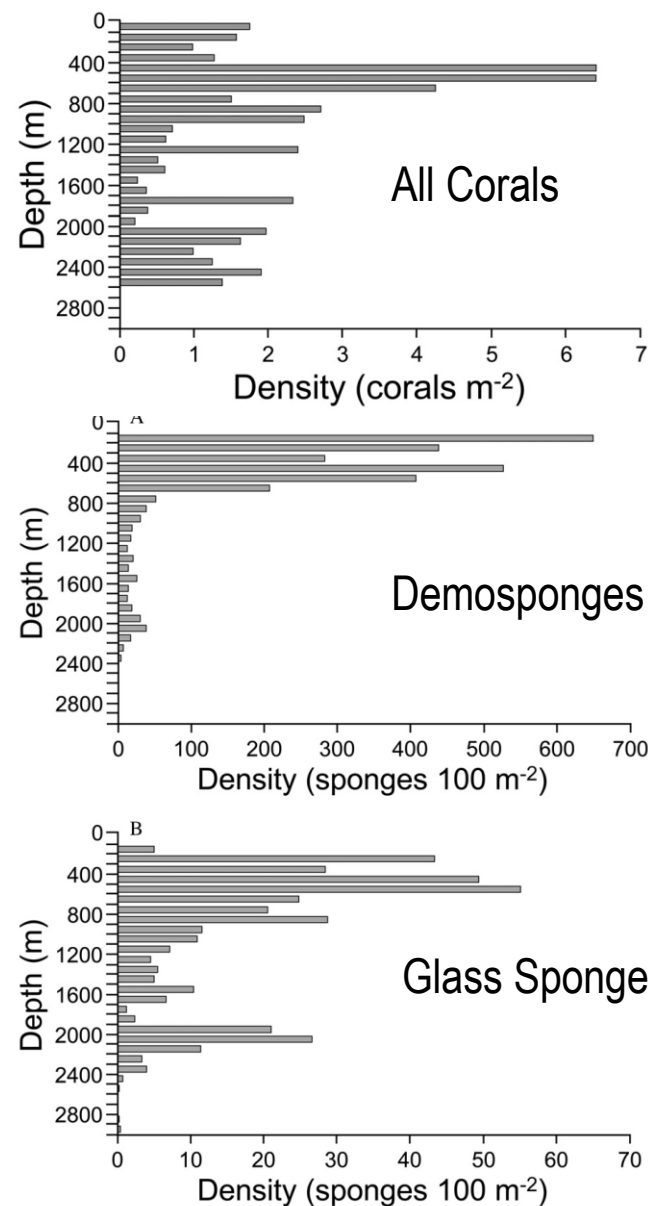
Bottom Trawl

Fish Pots

Longline Sets

Crab Pot Hauls

Source: Stone 2006



All Corals

Demosponges

Glass Sponges

Source: Stone 2014